

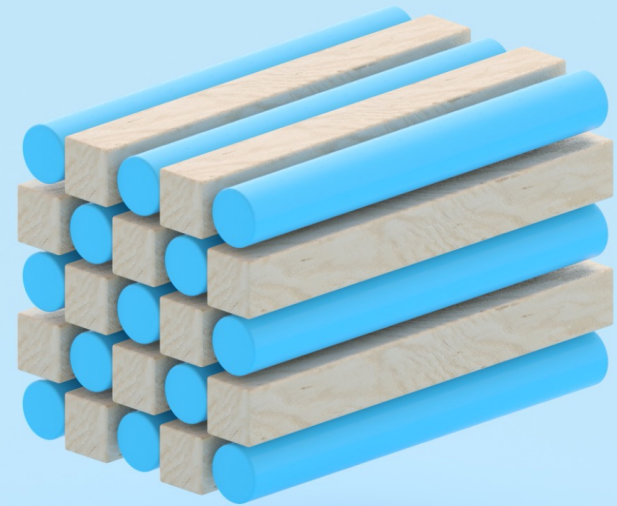
# Using Generative AI to Drive Engineering Productivity in the Enterprise

Innovation is the life blood of the Tech revolution

**Krish Vitaldevara**

Senior Vice President, Hybrid Cloud Platform Product & Engineering  
Jan 2024

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## About Krish Vitaldevara

<https://www.linkedin.com/in/krishvi/>

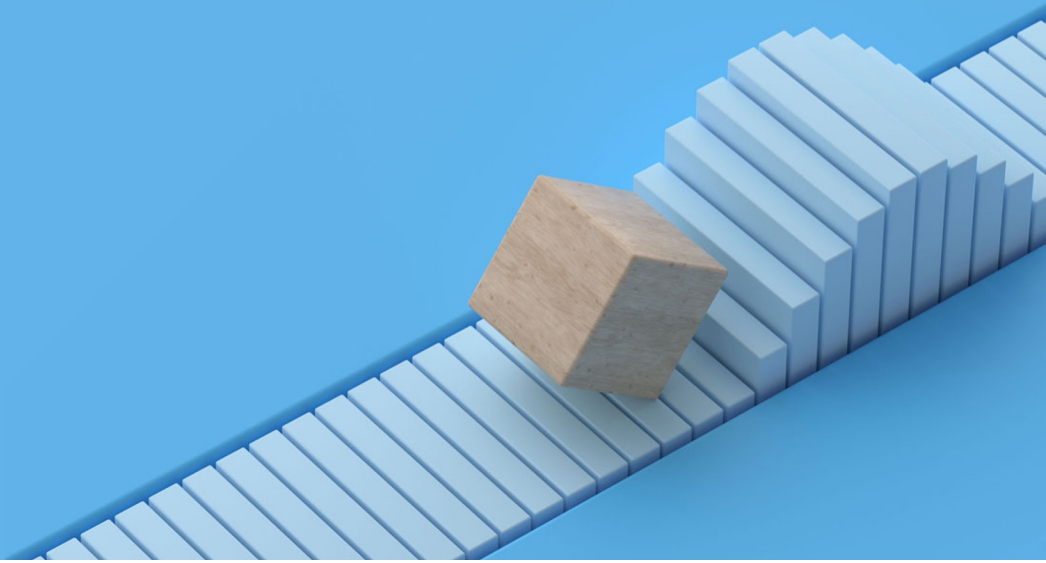
- Lives in Bay Area
- 25 years in the Tech Industry
- NetApp: Product and Engineering Leader
  - Core Platforms
- Ex-Google: Product Leader
  - Android and Play
  - Google Maps
- Ex-Microsoft: Product Leader
  - O365
  - Outlook.com
  - Microsoft consumer trust and safety teams



# Agenda

- About NetApp
- AI/ML evolution
  - Gen AI is a gamechanger
- Engineering productivity
  - GenAI opportunities
  - Barriers to adoption
    - Security
    - Licensing
- Future Engineer
  - Responsible AI

# About NetApp



# NetApp at a glance

## Industry-leading cloud services



Cloud storage



Compute operations



Cloud controls



Cloud services and analytics

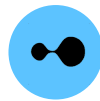
## Industry-leading software and systems



Flash and hybrid storage



Object storage



Converged and hybrid cloud infrastructure



Protection and security



Enterprise solutions

## Industry-leading solutions with an open ecosystem of partners



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- **Global** cloud-led, data-centric software company
- **Industry-leading** software, systems, and cloud services
- **Founded in 1992**, headquartered in San Jose, California
- **11,000+ employees** and **4,000+ partners** helping organizations thrive in a hybrid multi-cloud world
- **Fortune 500 company** (NASDAQ: NTAP)

## Customers trust us to **innovate** in storage and data management

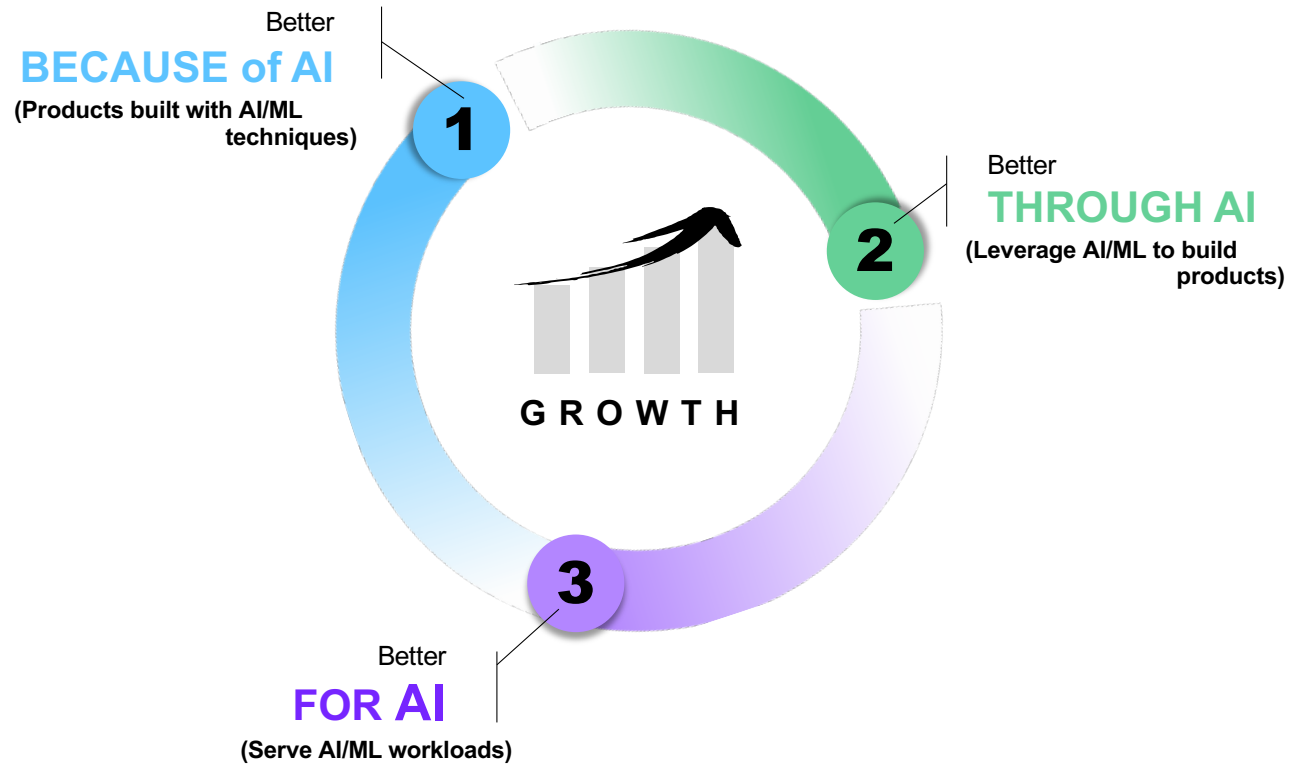


NetApp helps companies take disruption in stride and turn it into powerful innovation, just like we've done ourselves for three decades

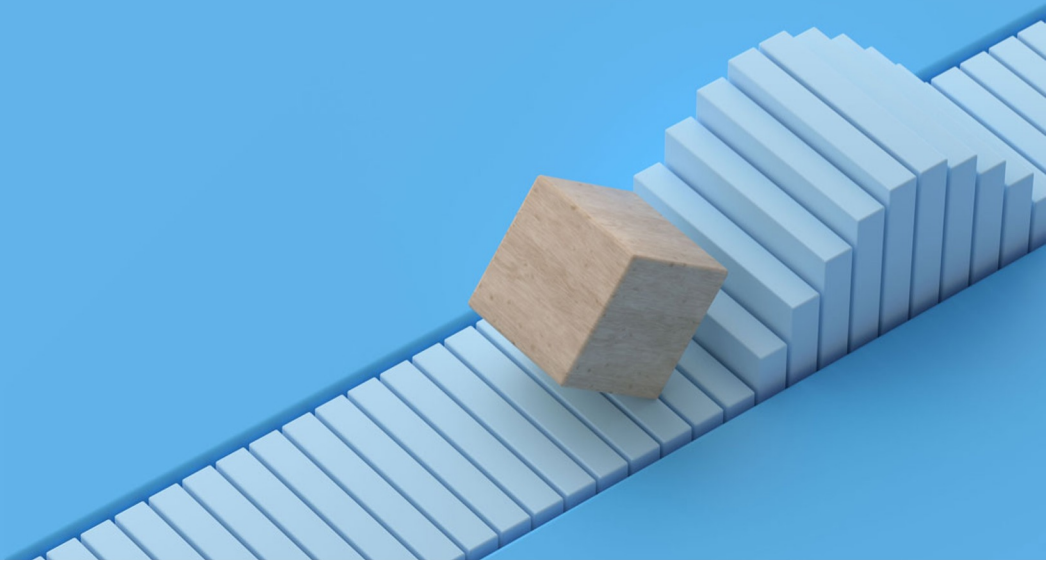
# AI-driven growth

(AI will transform every business to leverage data)

2024's will be remembered as a "Decade of AI"



# Generative AI

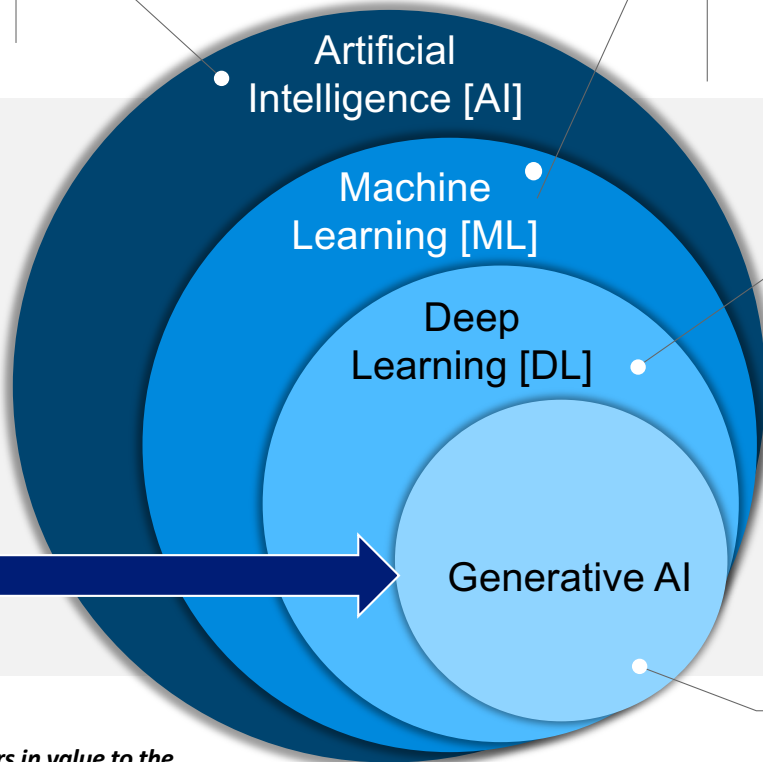




Any technique that enables computers to mimic human behaviour

Pattern recognition techniques that typically operate on features that have been manually engineered

**Generative AI is capable of generating new data based on context**



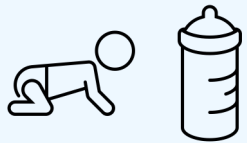
Learns underlying features in data using neural networks

Generates new data by learning from existing data

**McKinsey, June 2024**

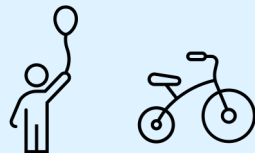
*Generative AI's impact on productivity could add trillions of dollars in value to the global economy. Our latest research estimates that generative AI could add the equivalent of \$2.6 trillion to \$4.4 trillion annually across the 63 use cases we analyzed—by comparison, the United Kingdom's entire GDP in 2021 was \$3.1 trillion.*

# Rapid evolution of GenAI



**2018**

Birth of generative AI models: GPT-1, GPT-2



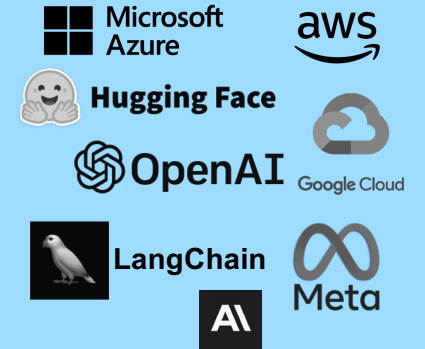
**2021**

Models learn to code: Codex from OpenAI

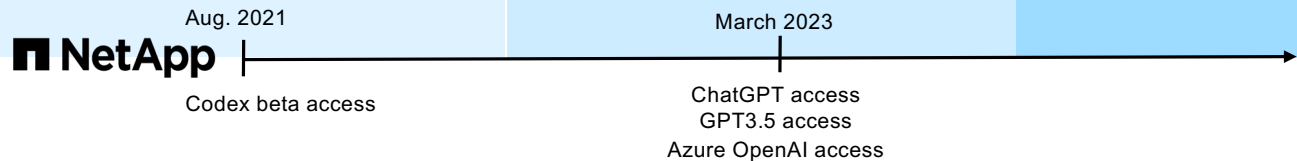


**2023**

Human level coding skills: GPT4

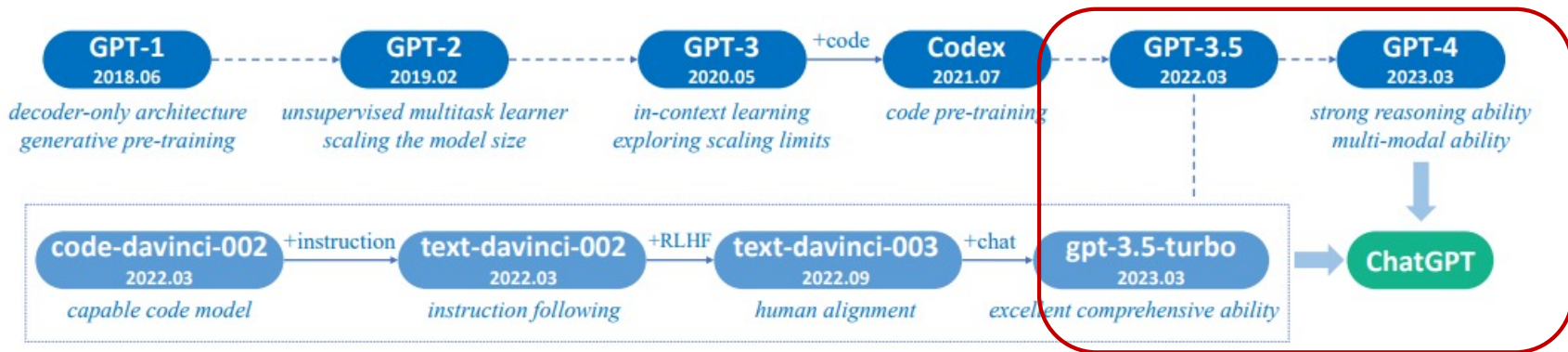


**Growing** ecosystem of AI models, tooling, hosting and deployment options



# Evolution of OpenAI models

<https://arxiv.org/pdf/2303.18223.pdf>



- Models got better at coding
- Then got better at following instructions
- Then got better at understanding follow-ups
- Then got cheaper
- Then feature gap between ChatGPT+ and paid API access started growing
  - Plugins
  - Multi-modal
  - Code interpreter, web browser

## **Why embrace Generative AI (e.g.OpenAI)**

**Shorter innovation cycle**

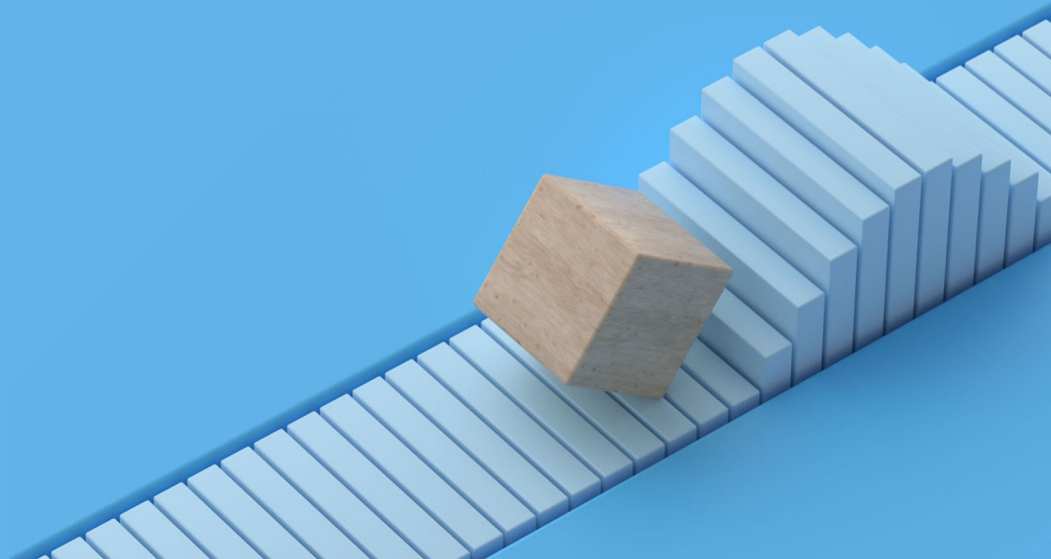
**Modernize automation infrastructure**

**Engineers spend more time on real code**



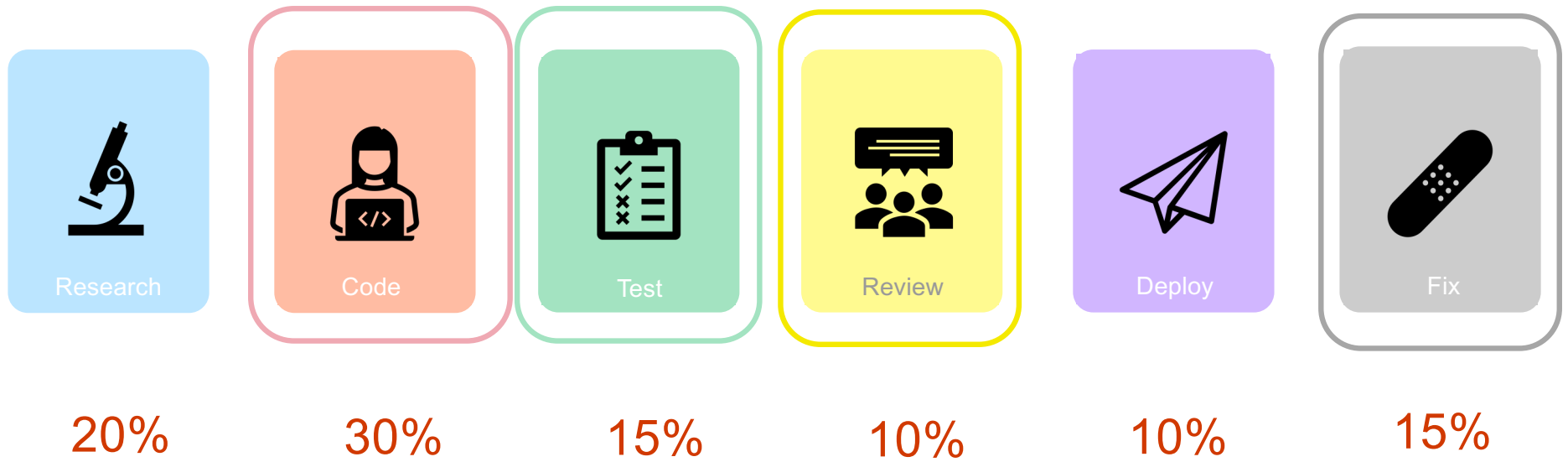
**OpenAI is a software engineering inflection point**

# Engineering Productivity



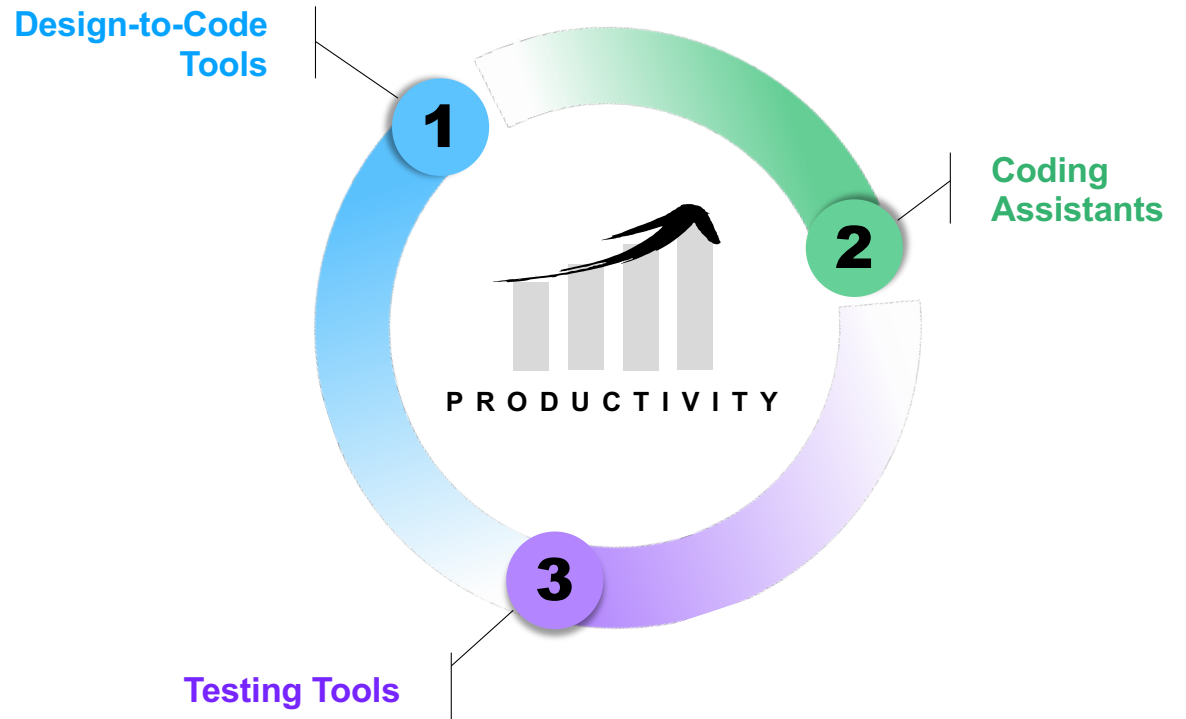
# Typical Engineering Workflow

Metric expressed as percentage of engineer time



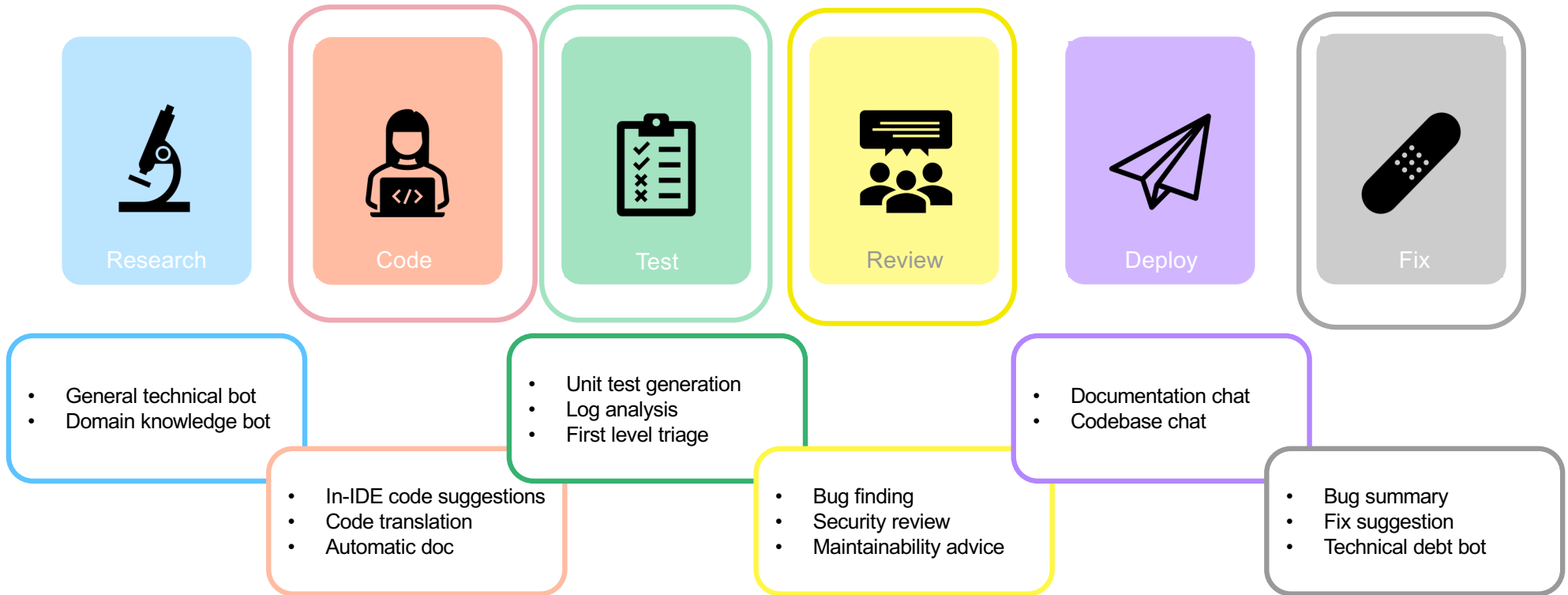
# AI-Augmented development

GenAI transforming all aspects of developer workflow



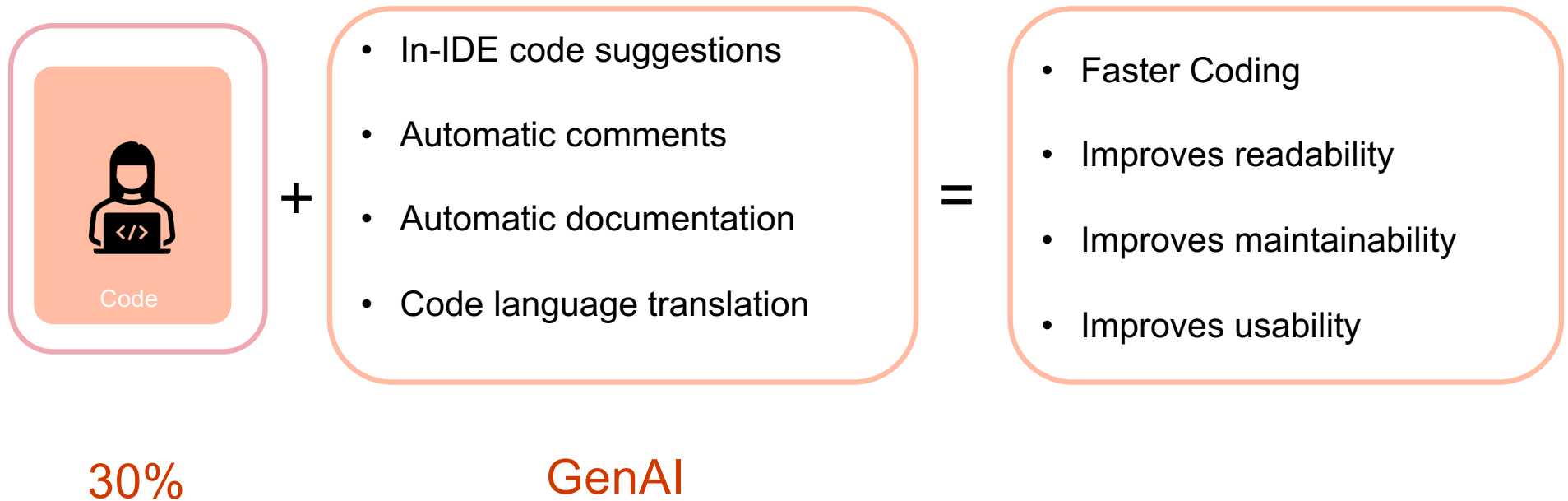
# GenAI positively impacts all aspects of developer workflow

From conversational experience with investigations to automatic code generation there is huge potential

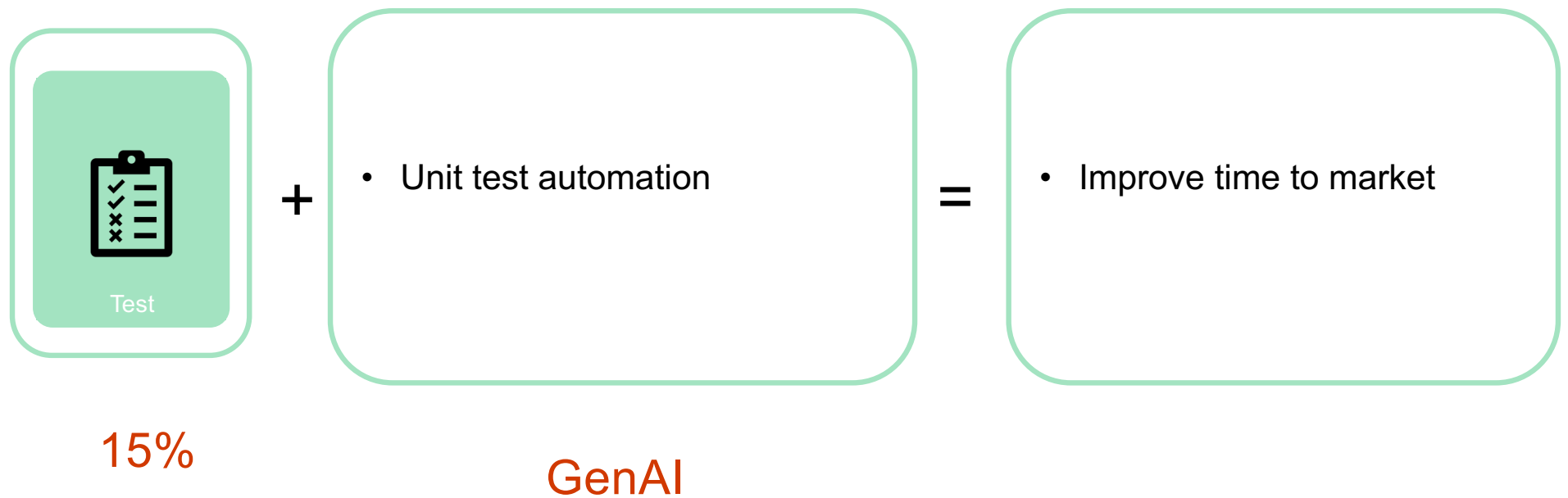




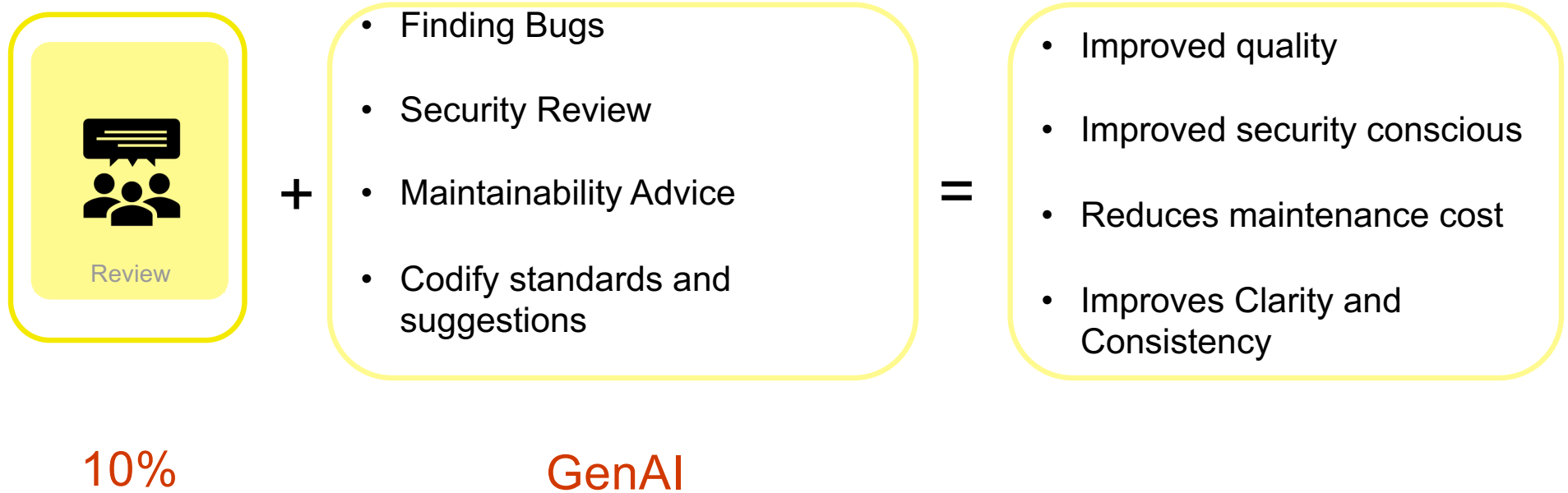
# GenAI could improve overall developer experience



## GenAI could help automate most of the unit tests



# GenAI could help with codifying coding standards



## GenAI could reduce overall development time



+

- Fix suggestions
- Automates defect management

=

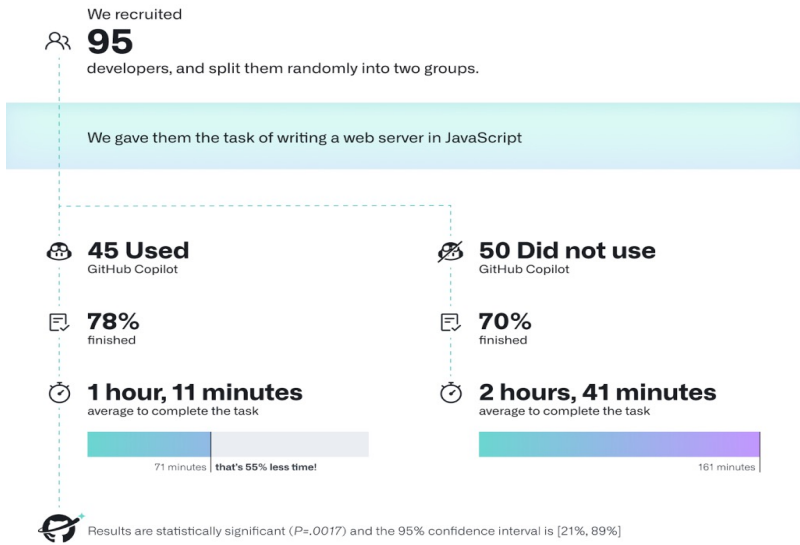
- Faster coding
- Improves developer time on code and design

15%

GenAI

# Feedback from early adopters (with GitHub Co-pilot)

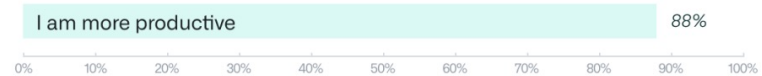
Developers seemed positive with the improvement in productivity thereby leading to more job satisfaction



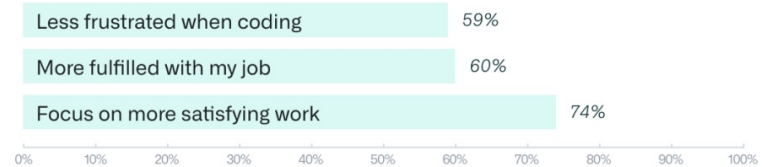
**46%**  
code written

## When using GitHub Copilot...

### Perceived Productivity



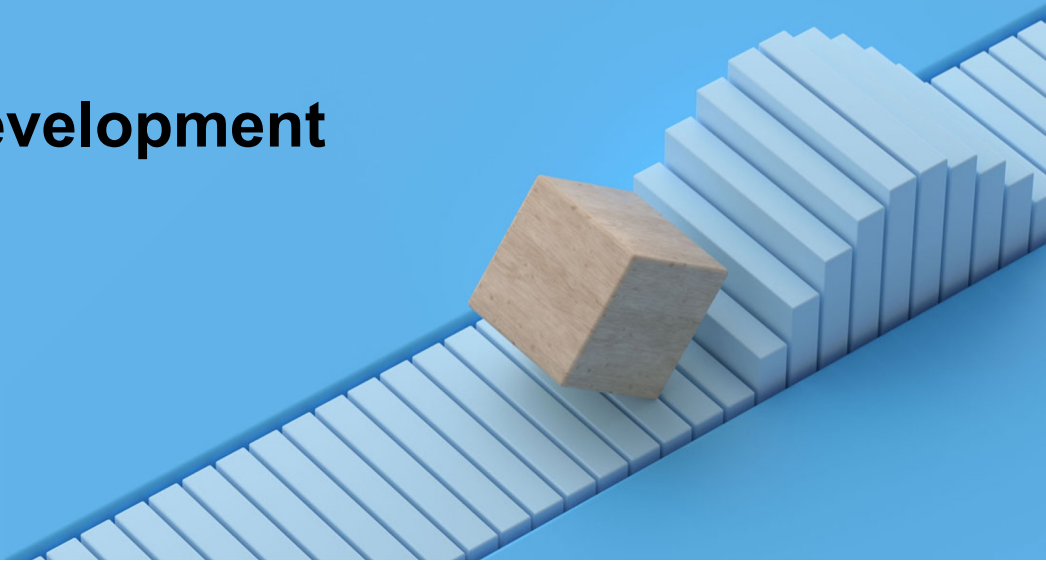
### Satisfaction and Well-being\*



### Efficiency and Flow\*

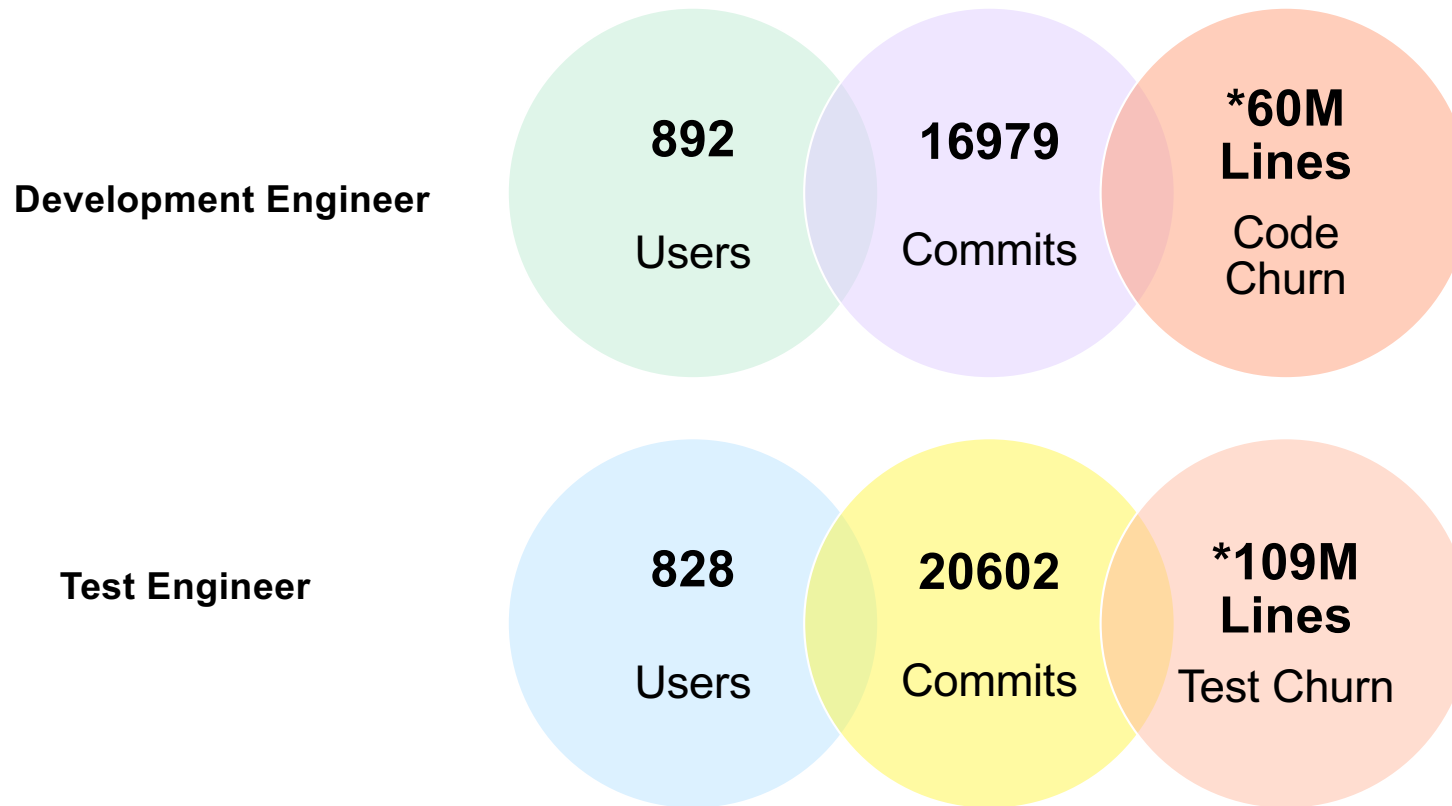


# Accelerating AI Augmented Development

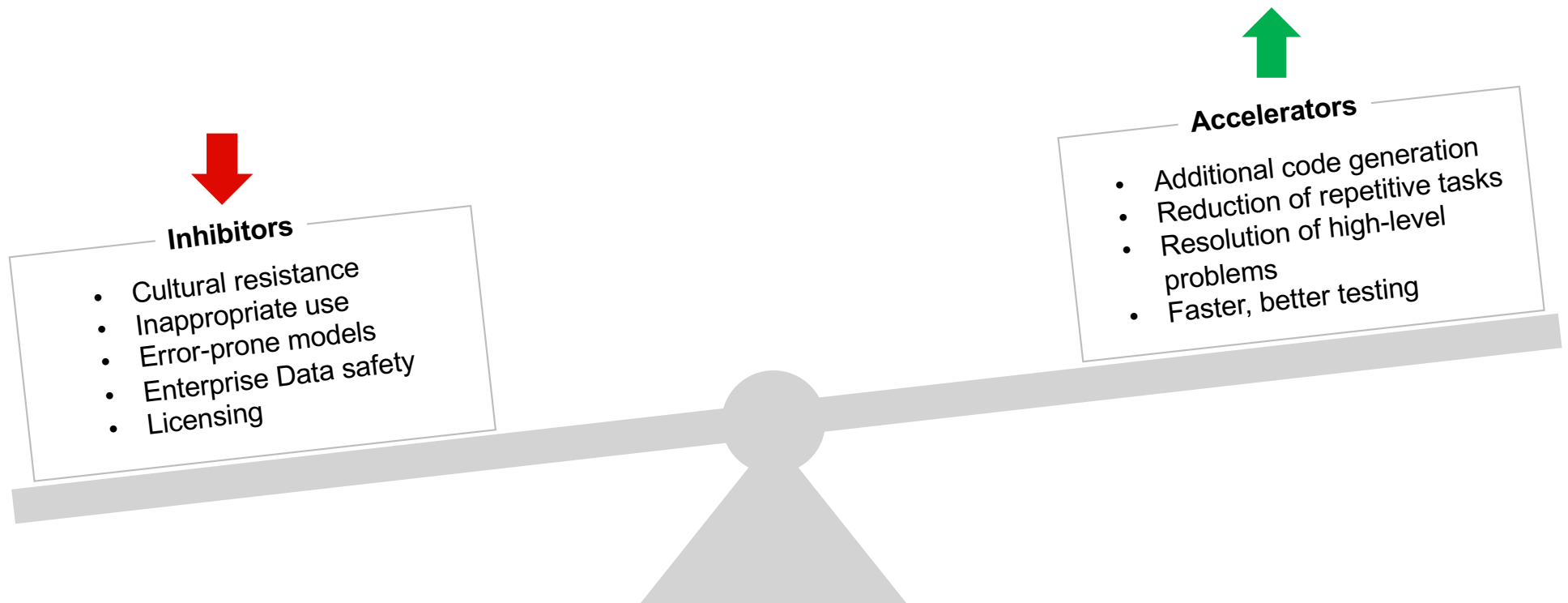


## AI-Augmented Development promise

Scale of change will mean a long time for adoption, but opportunity to gain efficiencies is huge



# Accelerators/Inhibitors of AI-Augmented Development





## Barriers to adoption: Data Safety

Azure/OpenAI shows promise

- Azure/OpenAI helps protect IP:
  - Pay as you go
  - Enterprise-level security
  - OpenAI models managed by MS/Azure
- How does it ensure data safety
  - Prompts are not used for model training
  - Prompts are not kept in Azure at all



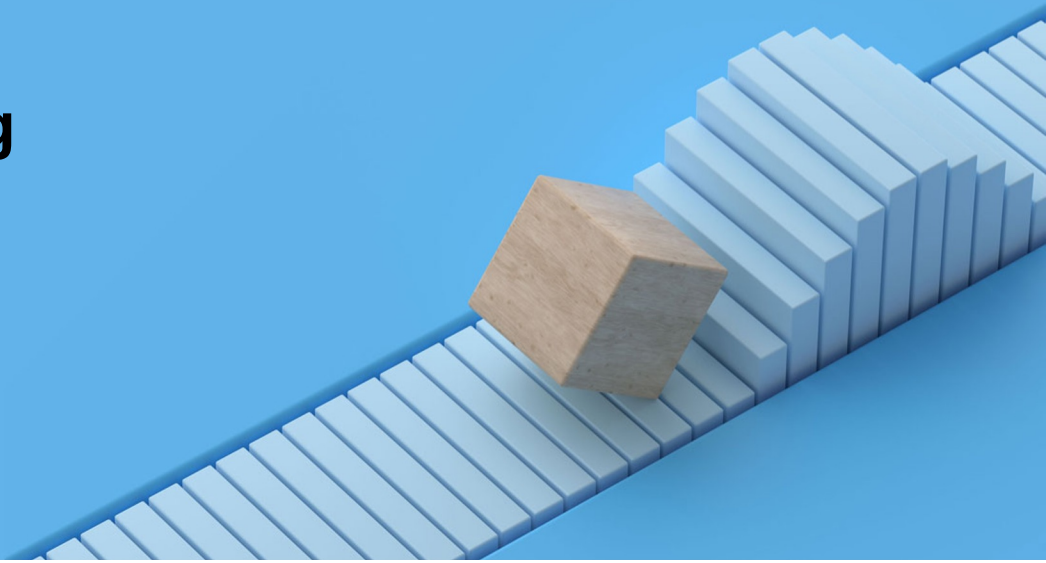
## Barriers to adoption: Legal and Regulatory

Be aware of emerging regulatory considerations

- Risk Analyses as Pre-requisite for GenAI use
  - Potential copyright infringement
  - Risk of loss of copyright (e.g. open source)
  - Need to protect confidential information
  - Unreliable or unlicensed output
  - Potential security concerns
- Evolving Legal and Regulatory Landscape
  - Numerous Proposed Legislations
  - Issuance of Executive Order on AI
  - Enactment of European Union AI Act

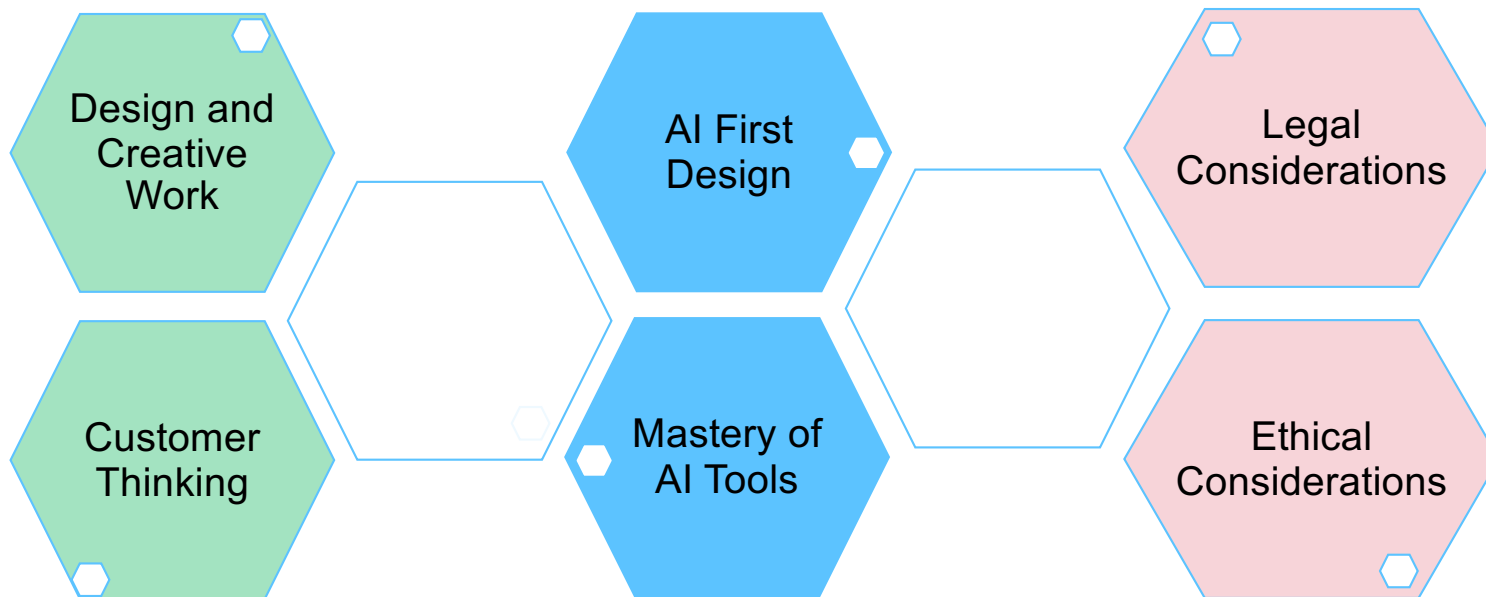


# Future of software engineering



## AI-augmented development will shape next decade

Future software engineer shifts focus to AI-first design principles and will have more time for creative work



Join us on your AI/ML journey with NetApp  
(<https://careers.netapp.com>):



# Thank you

“Let machines be machines and let humans be humans” - unknown

